WHAT IS CLAIMED IS:

1. An interferometry method, comprising:

directing a measurement wavefront to reflect from a measurement surface and a reference wavefront to reflect from a reference surface, the measurement and reference wavefronts being derived from a common light source;

directing the reflected measurement and reference wavefronts to overlap with one another and form an interference pattern, wherein paths for the measurement and reference wavefronts define an optical measurement surface corresponding to a theoretical test surface that would reflect the measurement wavefront to produce a constant optical path length difference between the measurement and reference wavefronts; and

varying the radius of curvature of a locally spherical portion of the optical measurement surface to contact a conical portion of the measurement surface, and detecting the interference pattern as a function of the radius of curvature.

2. The method of claim 1, wherein the constant optical path length difference is a zero optical path length difference.

3. The method of claim 1, wherein the radius of curvature is varied over a distance greater than the coherence length of the light source.

4. The method of claim 1, wherein the radius of curvature is varied over a distance less than the coherence length of the light source.

5. The method of claim 4, wherein the radius of curvature is varied according to a phase-shifting algorithm.

6. An interferometry method, comprising:

directing a measurement wavefront to reflect from a measurement surface and a reference wavefront to reflect from a reference surface, the measurement and reference wavefronts being derived from a common light source having a coherence length;

directing the reflected measurement and reference wavefronts to overlap with one another and form an interference pattern, wherein paths for the measurement and reference wavefronts define an optical measurement surface corresponding to a theoretical test surface that would reflect the measurement wavefront to produce a constant optical path length difference between the measurement and reference wavefronts; and

varying the radius of curvature of a locally spherical portion of the optical measurement surface to contact the measurement surface, and detecting the interference pattern as a function of the radius of curvature, wherein the radius of curvature is varied over a distance greater than the coherence length of the light source.

7. The method of claim 6, wherein the constant optical path length difference is a zero optical path length difference.

8. The method of claim 6, wherein the optical measurement surface is a spherical optical measurement surface.

9. The method of claim 6, wherein the optical measurement surface is an aspherical optical measurement surface.

10. The method of claim 6, wherein the radius of curvature is varied relative to a fixed measurement datum point.

11. The method of claim 6, wherein the measurement surface includes a conical surface.

12. The method of claim 6, wherein directing the measurement wavefront to reflect from the measurement object comprises focusing the measurement wavefront towards a measurement datum point.

13. The method of claim 12, wherein the measurement datum point is positioned prior to the measurement surface.

14. The method of claim 12, wherein directing the reference wavefront to reflect from the reference surface comprises focusing the reference wavefront towards a reference focal point.

15. The method of claim 14, wherein the reference focal point is positioned prior to the reference surface.

16. The method of claim 14, wherein the reference wavefront is reflected from a curved portion of the reference surface.

17. The method of claim 16, wherein the reference object reflects the reference wavefront back to the reference focal point.

18. The method of claim 16, wherein varying the radius of curvature of the optical measurement surface comprises translating the reference focal point.

19. The method of claim 18, wherein translating the reference focal point comprises translating reference optics used to focus the reference wavefront towards the reference focal point.

20. The method of claim 19, wherein varying the radius of curvature further comprises translating the curved portion of the reference surface simultaneously with translating the reference optics.

21. The method of claim 12, wherein varying the radius of curvature of the optical measurement surface comprises translating the measurement datum point.

22. The method of claim 21, wherein translating the measurement datum point comprises translating measurement optics used to focus the measurement wavefront towards the measurement datum point.

23. The method of claim 22, wherein varying the radius of curvature further comprises translating the measurement surface simultaneously with translating the measurement optics.

24. The method of claim 6, wherein directing the reflected measurement and reference wavefronts to overlap with one another and form the interference pattern comprises imaging the reflected measurement and reference wavefronts to overlap with one another on a planar image plane.

25. The method of claim 24, wherein the interference patterns are detected at the planar image plane.

26. The method of claim 24, wherein a portion of the optical measurement surface tangential to the measurement surface is imaged to the planar image plane.

27. The method of claim 13, wherein directing the reflected measurement and reference wavefronts to overlap with one another and form the interference image comprises imaging the reflected measurement and reference wavefronts to overlap with one another on a planar image plane.

28. The method of claim 27, wherein the imaging comprises positioning a collimating optic at the measurement datum point.

29. The method of claim 27, wherein the imaging comprises positioning a stop about the measurement datum point.

30. The method of claim 6, further comprising mapping the interference image to a portion of the measurement surface, wherein a distance between a point in the interference image and a common reference point in the image is related to a chief ray angle at the optical measurement surface.

31. The method of claim 30, wherein the common reference point in the image corresponds to an optical axis of an imaging system used to overlap the reflected measurement and reference wavefronts.

32. The method of claim 6, further comprising generating a radial height profile based on the interference patterns, wherein the radial height profile corresponds to the distance between the measurement surface and the optical measurement surface at a particular radius of curvature along a normal to the optical measurement surface at the particular radius of curvature.

33. The method of claim 32, further comprising reconstructing the measurement surface in Cartesian coordinates based on the radial height profile.

34. The method of claim 33, further comprising determining a deviation of the measurement surface from an ideal conical surface.

35. The method of claim 6, wherein the optical measurement surface tangentially contacts a portion of the measurement surface while the radius of curvature is varied.

36. The method of claim 6, wherein the measurement surface is imaged onto an image plane

37. The method of claim 36, wherein the reference surface is imaged onto the image plane.

38. The method of claim 36, wherein the overlapping reflected measurement and reference wavefronts are detected at the image plane.

39. The method of claim 6, further comprising translating the lateral position of the measurement surface relative to an optical axis of an imaging system used to overlap the reflected measurement and reference wavefronts.

40. The method of claim 6, wherein the interference patterns are detected using an electro-optic detector.

41. The method of claim 40, further comprising recording the detected interference patterns.

42. The method of claim 41, further comprising analyzing the recorded interference patterns using a computer processor.

43. An interferometry method, comprising:

directing a measurement wavefront to reflect from a measurement surface and a reference wavefront to reflect from a reference surface, the measurement and reference wavefronts being derived from a common light source;

directing the reflected measurement and reference wavefronts to overlap with one another and form an interference pattern, wherein paths for the measurement and reference wavefronts define an optical measurement surface corresponding to a theoretical test surface that would reflect the measurement wavefront to produce a constant optical path length difference between the measurement and reference wavefronts;

varying the radius of curvature of a locally spherical portion of the optical measurement surface to contact the measurement surface, and detecting the interference pattern as a function of the radius of curvature, and

generating a radial height profile, the radial height profile corresponding to the distance between the measurement surface and the optical measurement surface at a particular radius of curvature along a normal to the optical measurement surface at the particular radius of curvature.

44. The method of claim 43, further comprising reconstructing the measurement surface in Cartesian coordinates based on the radial height profile.

45. The method of claim 44, further comprising determining a deviation of the measurement surface from an ideal conical surface.

46. The method of claim 45, wherein the deviation of the measurement surface from an ideal conical surface is determined at a particular cone diameter.

47. The method of claim 45, wherein the deviation is determined in a direction perpendicular to the ideal conical surface.

48. The method of claim 45, further comprising determining a cone angle from the ideal conical surface.

49. The method of claim 45, further comprising determining a cone axis from the ideal conical surface.

50. The method of claim 43 wherein the radial height profile is generated using a computer processor.

51. A method for calibrating an interferometric system using a calibration artifact having a known shape, comprising:

directing a measurement wavefront to reflect from the calibration artifact and a reference wavefront to reflect from a reference surface, the measurement and reference wavefronts being derived from a common light source;

directing the reflected measurement and reference wavefronts to overlap with one another and form an interference pattern, wherein paths for the measurement and reference wavefronts define an optical measurement surface corresponding to a theoretical test surface that would reflect the measurement wavefront to produce a constant optical path length difference between the measurement and reference wavefronts;

varying the radius of curvature of a locally spherical portion of the optical measurement surface to contact the calibration artifact, and detecting the interference pattern as a function of the radius of curvature;

generating a radial height profile, the radial height profile corresponding to the distance between the calibration artifact and the optical measurement surface at a particular radius of curvature along a normal to the optical measurement surface at the particular radius of curvature; and

calibrating the interferometry system based on the radial height profile.

52. The method of claim 51, wherein the calibration artifact comprises a spherical surface.

53. The method of claim 51, wherein the calibration artifact comprises a conical surface.

54. The method of claim 51, wherein calibrating the interferometry system comprises reconstructing the calibration artifact in Cartesian coordinates based on the radial height profile.

55. The method of claim 54, wherein calibrating the interferometry system further comprises determining the position of the calibration artifact with respect to a measurement point datum based on the reconstructed calibration artifact.

56. The method of claim 55, further comprising moving the optical measurement surface relative to the calibration artifact based on the position of the calibration artifact.

57. An interferometry system, comprising

a light source having a coherence length;

an interferometer positioned to derive measurement and reference wavefronts from the light source, wherein during operation the interferometer directs the measurement wavefront to reflect from a measurement surface and the reference wavefront to reflect from a reference surface, and further directs reflected measurement and reflected reference wavefronts to overlap with one another and to form an interference pattern, wherein paths for the measurement and reference wavefronts define an optical measurement surface corresponding to a theoretical test surface that would reflect the measurement wavefront to produce a constant optical path length difference between the measurement and reference wavefronts;

a translation stage coupled to the interferometer to vary the radius of curvature of a locally spherical portion of the optical measurement surface to contact the measurement

surface, wherein the translation stage varies the radius of curvature over a distance greater than the coherence length of the light source; and

a detector positioned to detect the interference pattern as a function of the radius of curvature.

58. The interferometry system of claim 57, wherein the translation stage varies the optical path length difference by translating the reference surface.

59. The interferometry system of claim 57, wherein the interferometer comprises reference optics positioned to direct the reference wavefront to the reference surface and to direct the reflected reference wavefront to the detector.

60. The interferometry system of claim 59, wherein the translation stage varies the optical path length difference by translating the reference surface and the reference optics.

61. The interferometry system of claim 59, wherein the reference optics comprise a reference lens that focuses the reference wavefront towards a reference focal point.

62. The interferometry system of claim 57, wherein the reference surface is a planar surface.

63. The interferometry system of claim 57, wherein the reference surface is a curved surface.

64. The interferometry system of claim 63, wherein the curved surface is a spherical surface.

65. The interferometry system of claim 57, further comprising an object mount for positioning the measurement surface in the interferometer.

66. The interferometry system of claim 65, wherein the object mount positions the measurement surface in the interferometer so that when the radius of curvature is varied the measurement optical surface contacts at least a portion of the measurement surface.

67. The interferometry system of claim 65, wherein the object mount positions an object having a conical measurement surface in the interferometer.

68. The interferometry system of claim 65, wherein the interferometer further comprises measurement optics positioned to shape the measurement wavefront into a locally spherical measurement wavefront and to direct the reflected measurement wavefront to the detector.

69. The interferometry system of claim 68, wherein the translation stage varies the optical path length difference by translating the object mount and measurement optics.

70. The interferometry system of claim 68, wherein the measurement optics comprise an objective lens, which focuses the measurement wavefront toward a measurement point datum.

71. The interferometry system of claim 70, wherein the measurement point datum is located on an optical axis of the measurement optics.

72. The interferometry system of claim 70, wherein the measurement optics comprise an aperture stop and the measurement point datum is located at the aperture stop.

73. The interferometry system of claim 70, wherein the measurement optics comprise a collimating optic and the measurement point datum is located at the collimating optic.

74. The interferometry system of claim 73, wherein the collimating optic increases the numerical aperture of the measurement optics.

75. The interferometry system of claim 68, wherein the reference surface is located between the measurement optics and the measurement surface.

76. The interferometry system of claim 57, wherein interferometer comprises imaging optics which image a portion of the measurement surface to an image plane.

77. The interferometry system of claim 76, wherein the imaging optics also image the reference surface to the image plane.

78. The interferometry system of claim 76, wherein the translation stage varies the radius of curvature so that the optical measurement surface contacts the portion of the measurement surface imaged to the image plane.

79. The interferometry system of claim 78, wherein the optical measurement surface tangentially contacts the portion of the measurement surface imaged to the image plane.

80. The interferometry system of claim 76, wherein the detector is positioned at image plane.

81. The interferometry system of claim 80, wherein translating the translation stage causes the magnification of the image to change.

82. The interferometry system of claim 57, wherein the interferometer comprises a telecentric portion.

83. The interferometry system of claim 82, wherein the translation stage varies the radius of curvature of the optical measurement surface by varying the optical path length difference between the measurement and reference wavefronts in the telecentric portion.

84. The interferometry system of claim 57, further comprising a controller in communication with the detector and the translation stage, which during operation causes the

translation stage to vary the radius of curvature and records interference signals from the detector.

85. The interferometry system of claim 57, wherein the interferometer is a Twyman-Green interferometer.

86. The interferometry system of claim 57, wherein the interferometer is a Fizeau interferometer.

87. The interferometry system of claim 57, wherein the light source is a broadband light source.

88. The interferometry system of claim 57, wherein the light source is a point source.

89. The interferometry system of claim 86, wherein the point source is a super-luminescent diode.

90. The interferometry system of claim 57, wherein the light source is an extended source.

91. The interferometry system of claim 57, wherein the detector is a CCD detector.

92. The interferometry system of claim 57, wherein the constant optical path length difference is a zero optical path length difference.

93. The interferometry system of claim 57, wherein the optical measurement surface tangentially contacts the measurement surface.